DOCKET SECTION

BEFORE THE
POSTAL RATE COMMISSION
WASHINGTON, D.C. 20268–0001

POSTAL RATE AND FEE CHANGES, 1997

Docket No. R97–1

RESPONSE OF THE UNITED STATES POSTAL SERVICE
TO PRESIDING OFFICER'S INFORMATION REQUEST NO. 4
ITEMS 1–7, 8(b)-10
(October 10, 1997)

The United States Postal Service hereby provides its responses to the above items of Presiding Officer's Information Request No. 4, issued September 26, 1997. The questions are stated verbatim and are followed by the answers, with declarations from witnesses. Portions of some of the questions are answered by more than one witness. A response to 8(a) could not be completed today because of the early closure of Postal Service Headquarters.

Respectfully submitted,

UNITED STATES POSTAL SERVICE

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1. In a short-run analysis, economists typically consider a fixed production plant, i.e., a plant with a fixed capacity, and consider the costs of operating at various volume levels. Moving from one volume level to another can be said to involve changing the utilization rate of capacity. Such movements might occur for many reasons, including seasonality. If there is substantial fixity in the plant's operations, the marginal costs would be expected to be low, as would the volume variability of the costs. In a long-run analysis, consideration would be given to how the costs would respond to a larger volume, given that the capacity of the plant could be adjusted to accommodate that larger volume.

An analysis of postal operations using accounting period data would seem to focus on changes in the utilization rate. On the other hand, using data that reflect increases in volume throughout the year (in each season), would seem to include the effect of changes in capacity.

a. Please discuss which cost effects, short-run or longer-run, are more relevant for rate purposes.

b. Assuming the analysis should focus on longer-run volume adjustments, please discuss whether this information can be obtained from an analysis based on accounting period data.

1. Response:

The preamble to the question seems to suggest that because of fixity in a plant's operations, the short run marginal cost would be "low" and thus be less than the long run marginal cost. If made, this inference would not be completely accurate as the short run marginal cost (and variability) may be either greater than or less than the long run marginal cost (and variability). In particular, substantial fixity may mean that the plant's cost response to increases in volume is greater in the short-run, when the flexibility of some

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inputs is restricted, than it is in the long run, when the plant is free to choose any combination of inputs.

a. The relevant cost effects for rate purposes are the actual marginal costs incurred from a sustained change in volume. This was first explained in Docket No. R87-1 by witness William J. Baumol, who stated:[1]

> A final matter to be touched on briefly here is the choice of marginal costs upon which the rates should properly be based. Should these marginal costs be short run or long run in nature? As I will show, the answer is that they should be the actual marginal costs, whichever of those that may be. When an output of a service is increased (or decreased), there is only one amount of cost actually added (or saved), not two or three. The actual marginal costs are normally closest to what economists call short run marginal costs (SRMC). But it must be emphasized that these actual marginal costs do include cost consequences of a current volume change that may occur in future periods. [Emphasis in original]

This approach has been reaffirmed by witness Panzar in the current case:[2]

> One should attempt to base prices on the marginal costs that will actually be incurred by the firm to serve a sustained

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[1] See, Testimony of William J. Baumol On Behalf of the United States Postal Service, Docket No. R87-1 at 12.

[2] See, Response of John C. Panzar to NAA/USPS-T11-7.

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increase in volume over the time period during which the prices will be in effect. Taken literally, this would require that some version of short-run marginal costs should be used.

b. Yes, accounting period data may be used to examine longer run cost effects, particularly when the data are organized as a panel. The use of high frequency (monthly) data does not preclude estimation of long run effects.[3] Volume variability measures the percentage increase in cost from a sustained increase in volume. As I explain in my response to UPS/USPS-T14-41, one should control for short-term variations in hours not caused by sustained variations in volume. Also please note that my data set covers a relatively long time period (9 years) and thus includes changes in capacity through time.

The econometric results based upon the accounting period data cover a range of variabilities, so there is nothing inherent in the frequency of the data which preordains a variability to be "high" or "low". Finally, econometric results on annual data and on SPLY data are presented on pages 75-79 of my testimony. While less

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[3] See, for example, Dennis L. Hoffman and Robert H. Rasche, "Long-Run Income and Interest Elasticities of Money Demand in the United States," Review of Economics and Statistics, Vol. 73, No.4, 1991.

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accurate than the analysis based upon the accounting period data,[4] these results do serve to indicate that the econometric results are not a manifestation of the frequency of the data.

[4] For example, the annual data have only a few observation per site. They are therefore not as accurate as the accounting period data for eliminating the heterogeneity bias associated with a pooled model.

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2. Please identify the statistical properties that are assumed in the "errors in variables" analysis presented by witness Bradley in USPS-T-14 at pages 80-84; e.g., requirements for the distribution of the measurement errors. Please confirm that each assumption is satisfied and provide the rationale for the confirmation.

2. Response:

The primary assumption is that the measurement error is unobservable and measurement error is thus modeled as an independently and identically distributed random variable with a finite variance. To see what statistical properties this implies, consider the following model:

$$y_{it} = \alpha_i + \beta z_{it} + \varepsilon_{it},$$

where I = 1, 2, . . . N and t = 1, 2, . . . T. Suppose that the z_{it} are observed with measurement error:

$$x_{it} = z_{it} + \zeta_{it}.$$

Then, under the stochastic assumption for the measurement error, we can see that the following statistical properties are assumed to hold: $C(Z_{it}, \zeta_{it}) = 0$, $C(\alpha_i, \zeta_{it}) = 0$, $C(\varepsilon_{it}, \zeta_{it}) = 0$, and $V(\zeta_{it}) = \sigma_\zeta$. For an intuitive discussion of how such a measurement error could

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arise, please see my response to DMA/USPS-T14-31 c(vi.). By its very nature, the measurement error is unobservable. Consequently, there are no statistical tests that can be run to confirm the stochastic assumptions.

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3. The analyses of the manual operations in Workpaper 1 of USPS-T-14 demonstrate that the variabilities obtained when running the pooled regression model, with various combinations of variables, produces variabilities in the neighborhood of one. Whereas, introduction of the fixed effects model, plus the AP and lag variables, substantially reduces variabilities and provides results obtained by witness Bradley. Additionally, witness Bradley demonstrates in USPS-T-14, pages 39-43, the importance of site specific effects.

a. Please provide results such as the variabilities given in Table 1 of USPS-T-14, page 9, that distinguish the impact of the fixed effects model from the impact of the other variables. In particular, please provide results obtained for the following cases: (1) a regression analysis involving only the variables "hours worked" (HRS) and "Total Pieces Handled" (TPH) and a constant term when using the pooled model and a fixed effects model; (2) case (1) with the lag variable added; and (3) case (1) with all other variables added.

b. Please discuss in detail why the introduction of the "manual ratio" (MANR) and time variables in the analyses presented in USPS-T-1 Workpaper 1 do not seem to demonstrate a substantial impact on the variability until the use of the fixed effects model. Also, please provide a discussion of the way in which the fixed-effects model helps estimate the desired variabilities without confounding volume-related cost differences between facilities with cost differences caused by other factors. In the course of answering this question, please explain in operational terms how the interpretation of the variabilities in the simple pooled regression model differs from the interpretation of the variabilities in the fixed-effects models.

3. Response:

a. The question makes clear its intent is to ferret out the roles played by the fixed effect estimator and other the variables in the model. Thus, in implementing the requested econometric equations, I have tried to pursue an analysis that will best illuminate these separate roles. To do so, several decisions have to be made and they are discussed before the results are presented. For example, the question

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does not specify a functional form for the requested econometric analyses, yet one must be specified for an equation to be estimated. To ensure consistency, I used a translog functional form for estimating all the variabilities estimated below. In this way, the results are directly comparable without the additional complication of varied functional forms. In addition, the question is silent on whether or not the requested regressions should or should not be corrected for serial correlation. To ensure comparison with the results presented in my testimony, the results should be corrected for serial correlation. On the other hand, the Presiding Officer may wish to see the extremely simple models described in the question without such a correction. To facilitate a fuller understanding of these issues, I am thus providing all of the requested econometric results both ways: with a correction for serial correlation in place and without a correction for serial correlation.

The results presented below, in combination with the GNR tests presented on page 43 of my testimony, clearly and dramatically demonstrate that the pooled model presents biased estimates. This is not surprising, as the panel data estimator was developed to control for just such a bias:[5]

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[5] See, Keane and Runkel, "On the Estimation of Panel-Data Models withe Serial Correlation when Instruments are not Strictly Exogenous," Journal of Business and

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> In recent years, researchers in many disciplines, including economics, accounting, finance, and marketing have increasingly relied on panel data to model the behavior of individual firms. They have done so because panel data allows them to control for persistent unobserved differences among individuals or firms that in many instances may bias estimates obtained from the cross-sections.

Moreover, failure to control for site-specific effects can have serious consequences for the results:[6]

> Ignoring such parameter heterogeneity among cross-sectional or time series units could lead to inconsistent or meaningless estimates of interesting parameters.

Because these results are demonstrably and materially biased, they are not proper candidates for consideration by the Commission. I am pleased to produce these results to enhance the Presiding Officer's understanding of these issues, but I am reluctant to sponsor them, even in an indirect manner.

Several patterns in the results emerge. First, these results clearly corroborate the results of the statistical tests in my testimony that reveal the facility-specific effects are important and that the pooled results are thus biased. In many instances, the

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Economic Statistics, Vol. 11, No. 1., Jan. 1992.

[6] See, C. Hsiao, Analysis of Panel Data, Cambridge University Press, New York, 1986 at 5.

pooled results are well above 100 percent variability, topping out at about 112 percent for manual flats in the specification with all of the variables included. Moreover, because just correcting for serial correlation is an indirect way of reducing the bias from non-volume facility specific effects, the variabilities for the pooled model results with the serial correlation correction are always less than the results without the correction.[7] Such is not true for the fixed effects model in which the serial correlation correction sometimes increases and sometimes decreases the estimated variability.

Second, the more general specification that allows for a lagged effect to TPH changes generally has a material effect and usually increases the estimated variability. This general result corroborates my use of the lag term in the fixed effect model with all of the control variables.

Third, the results show that the manual ratio variable and the time-related variables play an important role in accurately estimating the variability.[8] As expected, these

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[7] To see this, compares rows one and two of each set of results.

[8] To see this, compare the third and fourth columns of each set of results.

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variables are more important in some equations than in others, but consider the letter and flat operations. As highlighted below, the additional variables are important in controlling non-volume effect and generally, although not always, increase the variabilities in both the pooled and fixed effects regressions.

CHANGE IN VARIABILITIES FROM
ADDING "OTHER" VARIABLES

MANUAL LETTER	
POOLED	2.0%
FIXED EFFECTS	4.0%
MANUAL FLAT	
POOLED	4.2%
FIXED EFFECTS	13.3%
LSM	
POOLED	6.0%
FIXED EFFECTS	4 7%
FSM	
POOLED	2.0%
FIXED EFFECTS	-1.2%
OCR	
POOLED	9.0%
FIXED EFFECTS	6.6%
BCS	
POOLED	2.6%
FIXED EFFECTS	-1.3%

The requested variabilities are presented below:

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MANUAL LETTERS

	Corrected for Serial Correlation?	TPH Alone	TPH & Lag TPH	All Variables
POOLED	NO	106.9%	107.0%	107.9%
POOLED	YES	100.7%	104.3%	106.3%
FIXED EFFECTS	NO	62.9%	61.9%	58.9%
FIXED EFFECTS	YES	74.4%	75.7%	79.7%

MANUAL FLATS

	Corrected for Serial Correlation?	TPH Alone	TPH & Lag TPH	All Variables
POOLED	NO	110.4%	110.6%	111.7%
POOLED	YES	101.4%	106.3%	110.4%
FIXED EFFECTS	NO	67.8%	68.5%	62.4%
FIXED EFFECTS	YES	67.0%	73 5%	86.6%

LSM

	Corrected for Serial Correlation?	TPH Alone	TPH & Lag TPH	All Variables
POOLED	NO	98.2%	98.3%	104.8%
POOLED	YES	94.9%	97.0%	103.0%
FIXED EFFECTS	NO	80.3%	80.2%	90 9%
FIXED EFFECTS	YES	84.6%	85.8%	90.5%

FSM

	Corrected for Serial Correlation?	TPH Alone	TPH & Lag TPH	All Variables
POOLED	NO	102.9%	103.1%	103.2%
POOLED	YES	97.3%	100.3%	102 3%
FIXED EFFECTS	NO	115.1%	119.1%	99.7%
FIXED EFFECTS	YES	83.8%	93.0%	91.8%

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OCR

	Corrected for Serial Correlation?	TPH Alone	TPH & Lag TPH	All Variables
POOLED	NO	104.8%	105.0%	109.3%
POOLED	YES	82.1%	93.6%	102.6%
FIXED EFFECTS	NO	88.9%	90.6%	93.7%
FIXED EFFECTS	YES	56.3%	72.0%	78.6%

BCS

	Corrected for Serial Correlation?	TPH Alone	TPH & Lag TPH	All Variables
POOLED	NO	106.5%	106.8%	108.4%
POOLED	YES	98.0%	102.9%	105.5%
FIXED EFFECTS	NO	101.7%	102.0%	100.6%
FIXED EFFECTS	YES	87.0%	95.8%	94.5%

MANUAL PARCELS

	Corrected for Serial Correlation?	TPH Alone	TPH & Lag TPH	All Variables
POOLED	NO	91.7%	93.5%	89.8%
POOLED	YES	54.8%	71.8%	67 4%
FIXED EFFECTS	NO	55 1%	58.3%	55.5%
FIXED EFFECTS	YES	35.0%	46.0%	39.5%

MANUAL PRIORITY

	Corrected for Serial Correlation?	TPH Alone	TPH & Lag TPH	All Variables
POOLED	NO	90.9%	91.4%	90.8%
POOLED	YES	76.2%	84.5%	79.0%
FIXED EFFECTS	NO	54.8%	54.4%	43.5%
FIXED EFFECTS	YES	59.4%	63.2%	44.8%

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CANCELLATION & METER PREP

	Corrected for Serial Correlation?	TPH Alone	TPH & Lag TPH	All Variables
POOLED	NO	104.8%	105.0%	103.6%
POOLED	YES	87.2%	96.7%	96.9%
FIXED EFFECTS	NO	58.3%	58.5%	51.9%
FIXED EFFECTS	YES	59.2%	66.8%	65.4%

SPBS NONPRIORITY

	Corrected for Serial Correlation?	TPH Alone	TPH & Lag TPH	All Variables
POOLED	NO	86.8%	87.5%	89.1%
POOLED	YES	59.4%	71.2%	72.7%
FIXED EFFECTS	NO	68.4%	69.7%	74.3%
FIXED EFFECTS	YES	41.5%	51.3%	46.9%

SPBS PRIORITY

	Corrected for Serial Correlation?	TPH Alone	TPH & Lag TPH	All Variables
POOLED	NO	100.8%	103.5%	100.3%
POOLED	YES	81.2%	93.3%	90.4%
FIXED EFFECTS	NO	89.3%	92.8%	94.6%
FIXED EFFECTS	YES	68.9%	82.0%	80.1%

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b. I don't agree with the inference that the manual ratio and time variables do not demonstrate a substantial impact on the variability until they are used in the fixed effects model. These variables are generally statistically significant in Workpaper 1. It is impossible to infer the bias caused by omitting the manual ratio and time variables using only Workpaper 1, because that workpaper typically does not present models for which they have been omitted. What most likely causes this inference is the extreme bias in the pooled model results. This bias is so large in the pooled model that it tends to overwhelm the material effect of the manual ratio and time variables. For a demonstration of the effect of the manual ratio and time variables within the pooled model framework, please see part a. above.

To understand how the fixed effects estimator works, and how it controls for non-volume differences across facilities without confounding the effects of volume differences, let's suppose that there are two reasons that hours vary across facilities, variations in volume and variations in non-volume factors. Suppose that the true model is given by:

$$h_{it} = \alpha_i + \beta v_{it} + \mu_{it}$$

In this equation, the variations in hours across facilities are caused by variations in

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volume (βv_{it}) and variations in non-volume factors (α_i). As the question suggests, one might be concerned that if the non-volume variation was correlated with the volume variation, the fixed effects estimator may not be able to accurately disentangle the two. In fact, the fixed effects estimator is designed to do just that, and it is the pooled estimator that confounds the two effects. To see this, note that the estimation of a pooled model requires the β coefficient to capture both the volume and non-volume effects. The bias in the pooled estimator thus depends upon the correlation between the volume and non-volume effects across facilities. This can be demonstrated by the following relationship:

$$\beta_{Pooled} = \beta + \frac{C(v_{it}\alpha_i)}{V(v_{it})}$$

Note that the fixed effects estimator does not require independence between volume variation and non-volume variation across facilities. Whether or not those variations are correlated, the fixed effects estimator provides an unbiased estimator of the volume variation. The fixed effects estimator uses the α_i to control for non-volume variations in hours across facilities leaving the estimated β coefficient to directly estimate the volume variations.

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The last part of the question requests operational interpretations of the simple pooled model and the fixed effects model. The fixed effects model controls for the non-volume heterogeneity across postal facilities. As I state on page 39 of my testimony:

> The fixed effects model allows for site-specific effects that would cause two facilities to have different levels of hours for the same amount of piece-handlings. Reasons for these differences include things like the age of the facility, the quality of the local work force, and the quality of the mail that the facility must process. When there are facility-specific effects, the model must be modified to allow for these effects. (Footnote omitted).

Thus, from an operational perspective, the fixed effects model gives the hours response to volume changes controlling for non-volume difference across sites. The pooled model, on the other hand, gives a biased measure of the hours response to volume changes by confounding it with other non-volume bases for variations in hours across facilities.

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4. Please discuss the apparent contradiction in the response of witness Moden to TW/USPS-T4-7 regarding the Postal Service's ability to size staff precisely with witness Bradley's explanation presented at USPS-T-14, at pages 57-58, that certain mail processing operations have low variabilities because they perform "gateway" or "backstop" functions.

4.Response:

It is my understanding that witness Moden's response was describing the Postal Service reactions to unexpected changes in daily conditions, like a machine breakdowns, whereas my discussion was referring to impacts on these activities from a sustained increase in volume. In his discussion of this latter effect (on page 21 of his testimony) witness Moden states:

> Manual cases become the method-of-last-resort, especially late in the evening as rejects from automated operations appear in quantity. To meet service commitments, manual cases must be staffed to handle these late surges.

In my discussion (on page 58 of my testimony) I state:

> In an automated environment, manual activities will serve as the backstop technology and these activities will be staffed so that they are available to sort the mail that cannot be finalized on automated equipment. In this way, the manual sorting activities serve as a form of insurance against service failures, but at the cost of lower piece productivity.[9]

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[9] Be careful not to mistakenly interpret the low productivity in manual operation as implying an increase in total cost. The lower productivity in manual operations arises in the attempt to reduce total cost (through automation) while maintaining present service standards.

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5. Does witness Bradley's selection of TPH as the cost driver for mail processing labor costs assume that the TPH for each cost pool activity in each facility is proportional to the volume of mail processed by the activity? If so, how important is the assumption of proportionality? Please discuss whether the ratio of TPH to volume for the cost pools has changed over the nine-year period examined by witness Bradley (due to changes in such things as mail mix and processing technology), whether the ratio varies significantly across facilities for the cost pools, or whether it varies significantly for a cost pool within a facility. To what degree do such variations conflict with the assumption of proportionality, and what are the implications for witness Bradley's analysis? Does witness Bradley's selection of TPH as the cost driver for mail processing labor costs assume that system TPH is proportional to system volume?

5 Response:

No, my analysis does not depend upon any such assumptions. As explained on page 5 of my testimony, the Postal Service mail processing analysis is performed in two steps:

> In this method, the Postal Service calculates subclass-specific volume variable costs in two steps. In the first step, sometimes called the "attribution step," the Postal Service multiplies accrued cost times the elasticity of those costs with respect to a cost driver. This multiplication produces the pool of volume variable cost.[10] In the second step, sometimes called the "distribution step," the Postal Service distributes the pool of volume variable cost to individual subclasses.

My testimony deals with the former of these two steps, estimating the variability of cost with

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[10] In postal costing, this elasticity is often called the "volume variability" of cost although it is formally the variability of cost with respect to movements in the cost driver. To avoid confusion, I maintain that convention here and use the terms "volume variability" and "cost elasticity" interchangeably throughout my testimony.

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respect to the cost driver. Estimating this relationship does not require an assumption about the relationship between TPH and volume. For example, the overall volume variable costs for a class of mail can be expressed as:

$$VVC_i = C * \varepsilon_{C,V_i}$$

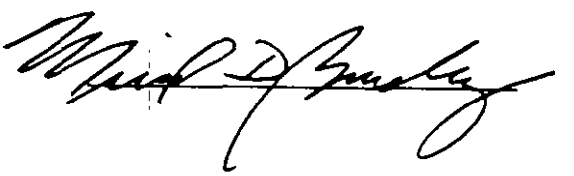
where VVC is volume variable cost and C is accrued cost. The required elasticity can be expressed as two parts, each reflecting one of the two steps described above:

$$\varepsilon_{C,V_i} = \varepsilon_{C,D} * \varepsilon_{D,V_i}$$

My analysis provides the first elasticity, the elasticity of cost with respect to the driver. This does not depend upon any assumptions about the second elasticity, the elasticity of the driver with respect to volume.

DECLARATION

I, Michael D. Bradley, declare under penalty of perjury that the foregoing answers are true and correct, to the best of my knowledge, information, and belief.



Dated: Oct 10, 1997

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5. Does witness Bradley's selection of TPH as the cost driver for mail processing labor costs assume that the TPH for each cost pool activity in each facility is proportional to the volume of mail processed by the activity? If so, how important is the assumption of proportionality? Please discuss whether the ratio of TPH to volume for the cost pools has changed over the nine-year period examined by witness Bradley (due to changes in such things as mail mix and processing technology), whether the ratio varies significantly across facilities for the cost pools, or whether it varies significantly for a cost pool within a facility. To what degree do such variations conflict with the assumption of proportionality, and what are the implications for witness Bradley's analysis? Does witness Bradley's selection of TPH as the cost driver for mail processing labor costs assume that system TPH is proportional to system volume?

5. Response.

To provide a full answer to the question, it is necessary to distinguish between volume variable costs at the cost component or element level (to simplify terminology, I will use the term "component" to mean either a CRA cost component or a subpart thereof, such as a mail processing cost pool), and volume variable costs distributed to subclass. At a general level, the volume variable cost of a component is defined as:

$$V_i = G_i \varepsilon_i = G_i \left(\frac{D_i}{G_i} \cdot \frac{dG_i}{dD_i} \right), \qquad (1)$$

where i indicates component, V volume variable cost, G total ("accrued") cost, ε elasticity of cost with respect to the cost driver, and D the cost driver (see USPS-T-11 at 21; LR-H-1 at vi and H-5 to H-7). Please note that the above formula is in no way new to the BY 1996 costing methodology; it serves as the basis for volume variable costs by component in the

methodology used in FY 1996 and previously by the Postal Service and the Commission. Witness Bradley's analysis does not alter the conceptual basis for volume variable costs relative to the FY 1996 analysis, rather, he provides alternate estimates of the mail processing variability factors ε. Given the selection of TPH as the cost driver, witness Bradley's econometrically estimated variabilities are, by construction, estimates of ε for the relevant cost pools. It follows that Table 4 in my testimony, USPS-T-12, notwithstanding the new partition of Segment 3 costs and the implementation of witness Bradley's estimated variabilities, performs the "attribution step" exactly as defined in LR-H-1 at H-5.

The role of an assumption of proportionality between the cost driver and mail volume depends on the method by which the distributed volume variable costs are computed. Consider witness Panzar's general definition of the volume variable cost distributed to subclass j:

$$V_{ij} = G_i \varepsilon_i \sigma_{ij}, \qquad (2)$$

where σ represents the elasticity of the component i cost driver with respect to the volume of subclass j:

$$\sigma_{ij} = \frac{M_j}{D_i} \cdot \frac{\partial D_i}{\partial M_j} \text{ (see USPS-T-11 at 23).} \qquad (3)$$

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Witness Panzar's formula corresponds to the "constructed marginal cost method" described in LR-H-1 at H-7. Please observe that M is system volume. The "volume" in activity i is the cost driver D. In contrast, mail processing costs have traditionally used, and in the BY 1996 methodology continue to use, the "volume variability/distribution key" method. In the distribution key method, volume variable mail processing costs by subclass are of the form:

$$V_{ij} = G_i \varepsilon_i \delta_{ij}, \qquad (4)$$

where δ represents distribution key elements. The distribution key elements are derived from IOCS data in the case of mail processing cost pools. The distribution key method is indicated when it is impossible to estimate σ directly. For instance, mail processing data sources do not report volumes by subclass that would be needed to estimate σ. Please note that the FY 1996 distributed mail processing direct labor costs are also of this form. The distribution key method has the intuitively appealing property that $\sum_j V_{ij} = V_i$ —i.e., for each component, the volume variable cost by subclass sum to the component's total variable cost as defined in equation (1), above—but requires a version of what the question terms the "assumption of proportionality" to equate unit volume variable cost with marginal cost. Conversely, the constructed marginal cost method, as its name suggests, requires no additional assumptions to equate unit volume variable cost with

marginal cost, but requires an assumption of proportionality to satisfy $\sum_j V_{ij} = G_i \varepsilon_i = V_i$.[1] Thus, the proportionality assumption equates unit volume variable and marginal cost in the distribution key method, and ensures that volume variable costs by subclass add up to the component total in the constructed marginal cost method (see USPS-T-11 at 23, and footnote 12). Consequently, the proportionality assumption is important for the interpretation of unit volume variable cost, particularly, for unit volume variable cost generated by the distribution key method to be equated with economic marginal cost. Since this is generically true for all volume variable costs generated by the distribution key method, the following discussion applies to both the FY 1996 and BY 1996 mail processing cost methodologies, noting that in the FY 1996 methodology, the mail processing cost drivers are not explicitly defined.

[1] There is no economic reason to impose this restriction in general, but the issue of whether or not it holds may affect the interpretation of volume variable cost at the component level.

More formally, the proportionality assumption equates the distribution key elements δ_{ij} with the elasticities σ_{ij}. The distribution key elements are defined as:

$$\delta_{ij} = \frac{D_{ij}}{D_i},^{2}$$

so using the definition of σ_{ij}, it must be the case that:

$$D_{ij} = M_j \cdot \frac{\partial D_i}{\partial M_j}.$$

This assumption holds when $\partial D_i / \partial M_j$ is constant, or in witness Panzar's terminology, when $D_i(M)$ is linearly homogeneous. For mail processing cost pools with TPH, the term $\partial D_i / \partial M_j$ is interpreted as the marginal increase in cost pool i's TPH resulting from a small increase in subclass j's (RPW) volume, holding non-volume factors constant. The proportionality assumption, then, is:

$$D_{ij} = a_{ij} M_j,$$

where a_{ij} represents (constant) TPH in cost pool i per (RPW) piece of subclass j. The proportionality assumption is that the number of TPH a typical piece of subclass j receives in cost pool i does not vary with the volume of subclass j, holding factors such as mail preparation and operation

[2] Please note that these cost driver proportions are estimated using proportions of IOCS tally costs for mail processing cost pools, since mail processing cost drivers are not observed by subclass. This is true of both the FY 1996 and BY 1996 methodology.

mix constant. Please note that the parameters a_{ij} will not, in general, be equal for different cost pools, or for different subclasses within a cost pool.

Since there have been significant changes in mail mix and mail processing operation mix over the period examined by witness Bradley, it is presumably the case that the parameters a_{ij} have also changed. For instance, certain a_{ij} parameters could decrease if subclass j becomes more highly presorted over time. Or, if automation equipment is improved such that more mail is automation compatible, then the a_{ij} parameters could increase for certain cost pools, indicated by i. However, since the mail processing distribution keys are updated every year (and, indeed, based entirely on PFY 1996 IOCS data), such long-run changes do not need to be accounted for in the distribution analysis. There is an implicit assumption that intra-year changes in mail mix and operations mix are small. Operation mix differences can cause differences in the a_{ij} parameters across facilities. This does not conflict with the assumption of proportionality per se, but rather indicates that the aggregate a_{ij} is an average of facility-specific a_{ij}'s. For a cost pool within a facility, variations in a_{ij} may be due to differences in mail preparation between or within subclasses of mail. The a_{ij}'s are defined to account for between-subclass variation. The analysis does not account for

within-subclass variation, so a_{ij}'s are determined for a "representative piece" of subclass j. If additional subclasses or rate elements were defined, the cost distribution methodology described in my testimony,USPS-T-12, could be straightforwardly extended to accommodate them. The formulation of TPH per piece (a_{ij}) above is the only relationship that is posited for a "system TPH" (i.e., total TPH by cost pool for all facilities) and "system volume" (RPW volume of subclass j). No assumptions at all are made regarding broader aggregates of TPH or volume.

I, Carl G. Degen, declare under penalty of perjury that the foregoing answers are true and correct to the best of my knowledge, information, and belief.

Carl G. Degen

10-10-97
Date

RESPONSE OF UNITED STATES POSTAL SERVICE WITNESS TAUFIQUE
TO PRESIDING OFFICER INFORMATION REQUEST NUMBER 4

Question 6.

Please provide the source for cells C51 and C52 of the "Discount" worksheet of witness Taufique's (USPS-T-34) Workpapers as shown in spreadsheet 2C_RR_X9.xls.

RESPONSE

The numbers in cells C51 and C52 are supposed to represent the sum of mail processing costs and delivery costs for 3-digit and 5-digit Automation letters as presented in witness Daniel's exhibit USPS-29C page 2. The actual numbers in the cells are incorrect and should be 8.1455 (4.7255+3.42) and 6.7847 (3.4227+3.362) in cells C51 and C52 respectively to reflect the numbers originally filed by witness Daniel.

Witness Daniel's revision of these costs is reflected in the supplement to my testimony filed October 10, 1997.

DECLARATION

I, Altaf H. Taufique, declare under penalty of perjury that the foregoing answers are true and correct, to the best of my knowledge, information, and belief.

ALTAF H. TAUFIQUE

Dated: OCTOBER 10, 1997

RESPONSE OF U.S. POSTAL SERVICE WITNESS HATFIELD
TO PRESIDING OFFICER'S INFORMATION REQUEST NO. 4

POIR No. 4, Question 7. Parcel Post

a. DSCF Entry Cubic Feet

The piece volume of DSCF parcels is 7.1071 percent of the piece volume of DBMC parcels excluding OMAS (USPS-T-37, Workpaper 1.F, page 3). These DSCF parcels are treated as zone 1/2 parcels (USPS-T-16, Appendix II, page 2). The cubic-foot volume of the DSCF parcels is developed on USPS-T-16, Appendix II, page 9, by multiplying the total DBMC cubic feet by 7.1071 percent.

Would it be more appropriate to develop the cubic-foot volume of DSCF parcels as follows:

(1) Determine the piece volume of DSCF parcels by multiplying the piece volume of DBMC parcels by 7.1071 percent.

(2) Express the piece volume of DSCF parcels as a proportion of the piece volume of zone 1/2 DBMC parcels.

(3) Multiplying the proportion found in (2) by the cubic-foot volume of zone 1/2 DBMC parcels.

If not, please explain.

b. Local Zone Parcels

USPS-T-16, Appendix III, page 7, shows local-zone parcels incurring, on average, $0.4788 of intermediate transportation costs. Basically, intermediate costs involve transporting parcels between BMCs and SCFs. The charge of $0.4788 appears to be based on some local-zone parcels being transported from an SCF to a BMC and then to another SCF (within the same BMC area). Please explain the handling procedures that result in local-zone parcels receiving this transportation service. If the charge shown is not the correct one, please supply revised figures.

c. Air Transportation

(1) Please confirm that Christmas network costs are included in the "loose sack and container rate" air costs ($1,217) shown on USPS-T-16, Appendix I, page 11, the distance-related portion for these costs being shown in footnote 2 as 36.41 percent.

In Workpaper B-14, Worksheet 14.0.7a, the distance-related portions for "loose sack and container" and Christmas network are developed separately. Would it also be appropriate to identify and treat separately the "loose sack and container" and Christmas network on USPS-T-16, Appendix I, page 11? If not, please explain why not.

RESPONSE OF U.S. POSTAL SERVICE WITNESS HATFIELD
TO PRESIDING OFFICER'S INFORMATION REQUEST NO. 4

(2) Distribution of air costs

Air transportation costs are distributed to the subclasses of mail on the basis of pound-miles. Then within parcel post, the distance-related portion of air costs is distributed on the basis of cubic-foot-miles and the nondistance portion on the basis of cubic feet, as done in prior dockets. Please explain why the parcel post air costs should not be distributed on the basis of pound-miles and pounds.

RESPONSE:

a. The method currently used in my testimony to develop the number of total cubic feet of DSCF mail uses the average cubic feet per piece of all DBMC mail (0.727). The method suggested in this question assumes the average cubic feet per piece for only zone 1/2 DBMC mail (0.725). In order to determine which method is more appropriate, further study would be needed as to the weight and cube characteristics of mail that is entered at a destination P&DC.

In any case, the suggested change to the calculation of the total number of DSCF cubic feet would have an almost insignificant effect on the results produced in my testimony. Specifically, adopting this new method would only change one cost estimate, zone 1/2 DBMC, by one one-hundredth of a cent.

b. As stated in my response to part (b) of UPS/USPS-T16-3, local zone intra-BMC parcel post may receive transportation between the local office where it originates and the P&DC and between the P&DC and the BMC. In order for local zone intra-BMC parcel post not to receive any transportation beyond the office of origin, the local office must identify and separate local zone pieces from the rest of the originating parcel post. Often times this separation does not occur because of space and time considerations.

Therefore, because local zone intra-BMC parcels will not always avoid transportation beyond the local office, only a portion of these costs were removed from the local zone transportation cost calculations.

In Docket No. R94-1, the local zone intra-BMC transportation cost was developed by determining the average transportation cost per cubic foot of all Parcel Post for surface non-distance related transportation costs. The majority of these costs were intra-SCF highway transportation. Using the framework described in my testimony, the previous methodology is equivalent to assigning two legs of local transportation to local zone intra-BMC parcels. If implemented in my testimony, the Docket No. R94-1 method for computing local zone intra-BMC transportation costs would result in approximately $0.80 per cubic foot. However, this methodology does not reflect the actual transportation patterns of local zone intra-BMC Parcel Post. If these parcels are held out then they should not receive any transportation between a local office and a P&DC. On the other hand, if they are not held out, they should receive transportation from the local office through the P&DC to the BMC, then back from the BMC through the P&DC to the local office from which it originates.

The local zone intra-BMC local and intermediate transportation cost estimates contained in my testimony are developed using a 50 percent factor to reflect half of the local zone intra-BMC parcels being held out. Although no field study has been done to estimate the amount of local zone intra-BMC parcels that are actually held out, the methodology used to estimate the transportation costs associated with local zone parcels provides a more accurate framework from which to analyze these costs. The

$0.4788 of intermediate transportation costs associated with local zone intra-BMC parcels is the correct figure and is developed using the methodology described above.

c. (1) Confirmed. Parcel Post Christmas network air transportation costs ($20,000) are included in the 'loose sack container rate' air costs ($1,217,000) shown in Appendix I, page 11, and a distance related factor of 36.41% is applied to the combined costs.

The distance related factor, 36.41%, represents a weighted average of the distance related factor for loose sack container rate air and Christmas network air. If weighted properly, combining the two types of air transportation costs into a single line would yield the same results as separating the two types of air transportation into separate line items. However, in responding to this question, I discovered that the distance-related percentages for loose sack container rate air and Christmas network air were weighted together using the transportation costs shown in Workpaper B-14, Worksheet 14.0.7a which reflects total transportation costs for all classes of mail. If represented on separate line items in my testimony, the distance related cost for two types of air transportation would be determined based on the relative amounts of volume variable Parcel Post transportation costs in the loose sack container rate and Christmas network air accounts.

By re-weighting the distance-related factor for both loose sack container rate air and Christmas network air using the relative proportions of volume variable Parcel Post transportation costs, the new factor is 35.21%. Using this new factor changes the unit transportation costs estimates for inter-BMC Parcel Post contained in my testimony;

however, none of the total unit transportation cost estimates changes more than 0.05%. Corrections to my testimony reflecting the revised distance-related factor are being filed concurrently with these responses.

(2) In Docket No. R94-1, the Commission distributed all parcel post purchased transportation costs to zones on the basis of cubic feet and cubic foot-miles. That same practice was used in my testimony for three reasons. First, this methodology is consistent with the methodology used by the Commission in Docket No. R94-1. Second, the majority of Parcel Post transportation costs shown in my testimony on page 11 of Appendix I are distributed to the classes and subclasses of mail on the basis of cubic feet and cubic foot-miles. Third, cubic feet and cubic foot-miles were used for distribution of all Parcel Post transportation costs to zones in order to avoid introducing additional complexity to the cost distribution methodology. Because the Parcel Post air transportation costs shown on page 11 of Appendix I represent less than three percent of base year Parcel Post transportation costs, redistributing the costs using pounds and pound-miles would have a minimal effect on unit transportation cost estimates.

RESPONSE OF U.S. POSTAL SERVICE WITNESS HATFIELD
TO PRESIDING OFFICER'S INFORMATION REQUEST NO. 4

POIR No. 4, Question 9. USPS-T-16, Appendix I, page 13, shows that 4.48 percent of inter-BMC parcels are entered at an origin BMC. These parcels avoid one local transportation leg and one intermediate transportation leg. Please present any information available on the proportion of inter-BMC parcels that are entered at an origin SCF, which would thereby avoid one local transportation leg. If this proportion is unavailable, please discuss whether the proportion is likely to be negligible.

RESPONSE:

I am not aware of any information available on the amount of Parcel Post that is entered at an origin P&DC or whether this proportion is likely to be negligible. Within the framework of my analysis, however, it is unclear exactly what impact the addition of this proportion would have if it were available. As discussed in my response to UPS/USPS-T-16-29, it would not be accurate to account for a portion of Parcel Post volume that avoids a leg of transportation from a local office to an origin P&DC without also considering the volume that avoids a similar leg of transportation from the destination P&DC to the destination local office. To the extent that these two volumes are similar, the effect of including them in my analysis would be minimal.

RESPONSE OF U.S. POSTAL SERVICE WITNESS HATFIELD
TO PRESIDING OFFICER'S INFORMATION REQUEST NO. 4

POIR No. 4, Question 10. USPS-T-16, Appendix I, page 13, shows that 7.11 percent of DBMC parcels are entered at a destination SCF. Please discuss the conditions under which and the extent to which these parcels would be permitted currently to pay (1) the DBMC rate or (2) the local rate.

In answering this question, please clarify the definition of local zone found in DMM G030.2.1, which appears to distinguish between post offices serving one 3-digit area from those serving more than one 3-digit area. For example, the Washington, D.C., post office appears to service ZIP Codes 202, 203, 204, and 205. Would a parcel for ZIP Code 203 brought to the Washington post office be eligible for the local rate? If not, is there some office other than the Destination Delivery Unit to which this parcel could be brought in order to qualify for the local rate?

RESPONSE:

It is my understanding that parcels deposited at a destination SCF are currently permitted to pay the DBMC rate when the conditions in DMM E652.4.0 are met. Based on DMM G030.2.1, only parcels deposited at a post office for delivery to addresses within the delivery area of that post office are eligible for the local zone rate.

It is my understanding that the local zone rate will apply to all mail that both originates and destinates within the same 5-digit ZIP Code area or across multiple 5-digit ZIP Code areas provided they are part of the same post office. For post offices that service multiple 5-digit ZIP Code areas, the local zone rate will apply to all mail that originates and destinates within any of the 5-digit ZIP Codes that are part of that post office. DMM G030.2.1 appears to be making a distinction between post offices serving one 5-digit ZIP Code from post offices serving more than one 5-digit ZIP Code and does not address situations where post offices serve multiple 3-digit ZIP Codes.

DECLARATION

I, Philip A. Hatfield, declare under penalty of perjury that the foregoing answers are true and correct, to the best of my knowledge, information, and belief.

Philip A Hatfield

Dated: 10-10-97

8. Alaskan Bypass Mail
b. Pickup Volumes
   (1) In the development of the parcel post revenue adjustment factors (USPS-T-37, Workpaper 1.D, page 7), a portion of the pickup fee revenue is subtracted from the Intra-BMC RPW revenue with the remainder from the Inter-BMC RPW revenue. Are DBMC and Alaska Bypass eligible for pickup services? Please confirm that DBMC and Alaska Bypass revenues are not adjusted for any portion of the pickup revenues.
   (2) The TYBR pickup volumes are developed (USPS-T-37, Workpaper 1.1, page 1) using the ratio of total TYBR parcel volume to total BY parcel post volume. Should the DBMC and Alaskan Bypass volumes be excluded in development of the parcel post pickup volumes? If not, please explain.

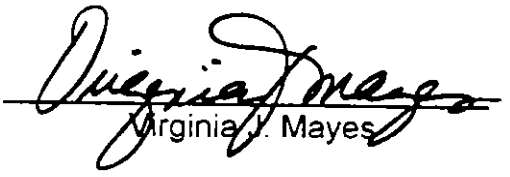
Response:

b. (1) Neither DBMC nor Alaska Bypass Parcel Post is eligible for pickup service. In the calculation of the revenue adjustment factors for Parcel Post, neither Alaska Bypass nor DBMC revenues were adjusted for pickup revenue.

(2) Estimation of the test year pickup volumes could be performed by reference to the ratio of test year volume to base year volume, excluding DBMC and Alaska Bypass volumes. If this adjustment were made, the formula that develops the pickup volume should be changed such that the new volume over 108 inches is limited to the new oversized intra-BMC and inter-BMC volume. The result would be a decrease in the test year pickup volumes and costs, relative to the figures shown in my workpaper WP I.I., at page 1. If such adjustments were made, it would no longer be valid to assume that the test year pickup revenues remained a constant share of total Parcel Post revenue (See page 1 of my workpaper WP I.O.).

DECLARATION

I, Virginia J. Mayes, declare under penalty of perjury that the foregoing answers are true and correct, to the best of my knowledge, information, and belief.

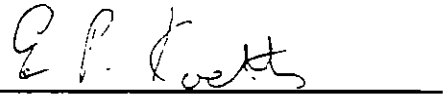


Virginia J. Mayes

Dated: 10-10-97

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon all participants of record in this proceeding in accordance with section 12 of the Rules of Practice.



Eric P. Koetting

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